TECHNOLOGY MANAGEMENT -- TWELVE STEPS TO TRIMMING YOUR TCO

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March 01, 2001

As schools purchase computers at an ever-growing rate, it becomes increasingly critical for them to implement strategies to get the most out of their investment. The easiest way to do this is to pay attention to total cost of ownership (TCO).

TCO represents the true cost of a computer over its lifetime. It's a way for administrators to understand and manage all costs related to their technology purchases, including up-front costs and after-purchase direct and indirect expenses.

The following are all factors in calculating TCO: procurement costs (bids, contracts); original equipment cost; software; service and support; training; upgrade costs; loss of productivity (down time, recreational computing); file server costs; cabling; internet access; and asset tracking.

The Gartner Group, a Connecticut-based consulting firm, recently estimated the TCO of a personal computer in an average corporate setting as between $9,000 and $12,000 per year (Kirwin, 1997). But TCO can vary from industry to industry, depending on many factors. For instance, in 1997 International Data Corp. (IDC) surveyed 400 school officials and estimated that the TCO for a school with 75 computers was $2,251 per computer, per year, while a comparably-sized small business had a TCO of $4,517 per computer, or more than twice that amount.

IDC said this difference resulted from four factors: Schools purchase less expensive PCs at larger discounts than businesses do; educational software packages are priced lower than business software applications; schools use roughly half the number of people that businesses do to support the same number of PCs; and schools typically use their computers for five years, compared to three years for businesses Consortium on School Networking [CoSN], 1999.

If you understand TCO, you can lower your costs by changing how you implement technology in your schools. Here's a 12-step plan for trimming the cost of your district's computers over their lifetime.

1. Define How You'll Use Technology In Your School Or District.

The first key to reducing TCO is to identify how technology will be used in your district. Your school district's technology plan will serve as a valuable resource during this phase. If the software platforms you're considering don't support the curriculum you're planning to offer, or if your computer systems are designed in isolation, your investment in technology won't pay off.

For example, one school district might decide that its priority is information literacy, so it would choose equipment to support a limited number of applications: word processing, accessing web sites or online databases, and so on. The hardware in this model may consist of closed-end computers, such as terminals or network computers. Another district might be more interested in integrated learning systems or multimedia applications, so its priorities for hardware, software, and deployment would be totally different. This district would need more graphics capabilities, labs, and/or clusters.

Once you define your uses of technology, you can begin to analyze costs and implement strategies to reduce your TCO. For additional information on technology planning, refer to the following web sites:

North Central Regional Educational Laboratory
http://www.ncrel.org/

National Center for Technology Planning
http://www.nctp.com/

2. Adopt A Uniform Standard For Equipment.

Hardware and software should be standardized as much as possible to reduce complexity. It's both easier and less expensive to support a limited number of applications and computing environments than it is to support several disparate systems.

Defining standards requires only up-front time, followed by periodic valuations. If end-users and technicians can be trained to work with a specific set of hardware and software, they will become familiar--and proficient--with the equipment in a shorter period of time. Hardware repairs can be simplified by reducing the number of vendors you have to deal with. Schools can also purchase spare computers that are interchangeable and keep them on hand, so end-users can have replacement machines quickly.

Another way to lower TCO is to standardize network configurations. Several third-party products on the market can automate the creation and management of user profiles, thereby simplifying configurations. Profile Maker, from AutoProf.com of Portsmouth, N.H., is one product that standardizes the configuration and administration of client profiles and user information on a network. For example, Profile Maker allows you to store a user's Microsoft Exchange mailbox on the school district network, instead of a specific computer. The user can log in from any computer on the network and access his or her Exchange files, thus reducing the amount of customization that must occur on the desktop.

Profile Maker's price is reasonable, starting at $229 for a 100-user license. If you calculate how much time you spend manually configuring Exchange Server or Outlook on client systems, you might find that Profile Maker more than pays for itself by drastically reducing that figure.

AutoProf.com
(603) 433-5885
http://www.autoprof.com/

3. Implement Terminal Servers And Consider Thin Clients.

Terminal servers, such as those made by Citrix and Microsoft, can deliver software from a centralized file server, reducing the need to load and manage software on individual computers. Users simply connect to the network and all applications are delivered centrally from the terminal server. This technology is not platform-specific, so any computer can be used. For example, an older Macintosh computer attached to a school's local network can run Windows applications from the terminal server.

This delivery method offers many advantages, most notably the ability to centrally manage applications. All software configuration and management can be performed centrally, and there is no need to configure individual client machines. Another advantage is that older, legacy machines can be used to run the latest software programs. However, this approach demands a robust network with powerful file servers and considerable expertise to manage the system.

Centralized, server-based computing also enables you to purchase cheap, interchangeable devices--such as internet appliances and network computers--for the delivery of simple applications. Network computers are closed systems that run applications from a central server. These units are also referred to as "thin clients" and are increasing in popularity. Since they are closed systems without moving parts, maintenance is minimal. Installation consists of connecting the keyboard, mouse, and monitor and turning the unit on.

The TCO of thin-client devices is significantly lower than that of full-power computers over time, because they break down less frequently and can be supported easily. Pricing for these units--which are still in their infancy and presumably will become more popular as the technology advances and becomes cheaper--ranges from $400 to $900 at present. The downside: They require a robust infrastructure, including a 100 MB Ethernet network and high-capacity servers, and they might not be right for all applications. The New Internet Computer Co., a spin-off of Oracle Corp., offers a $199 Linux-based device that soon could be widely deployed in schools.

Citrix Systems Inc.
(800) 437-7503
http://www.citrix.com/

Microsoft Corp.
(425) 882-8080
http://www.microsoft.com/

The New Internet Computer Co.
(877) 926-8642
http://www.thinknic.com/

4. Set A Life Cycle For New Computers--And Plan Accordingly.

The single biggest mistake most schools make is not planning ahead and budgeting adequately for the replacement of obsolete equipment. It actually costs more money in the long run to use older and ailing machines than it would cost to replace them at regular intervals, once you factor in the expense of replacement parts, labor, and the loss of instructional time.

Costs also escalate as equipment becomes older and less homogeneous: warranties expire, software requirements outgrow hardware capabilities, vendors phase out support for older systems as technologies advance, and training ecomes more difficult to find.

In addition, as equipment ages, there is the temptation to "cascade" the equipment so that preferred users (such as middle and high schools) get the newest machines, while the old equipment replaces even older machines on the desktops of lower-priority users (elementary schools). Aside from the obvious morale issues this might cause, cascading dilutes the equipment pool and increases the variety of equipment that needs to be supported (Computer easing Task Force, 1999).

School districts should estimate the number of years they can expect to keep new equipment operational at the time of purchase and should make adequate provisions at that time. Many districts have committed to replacing computers every three to five years, thus staying current with technology.

5. Consider Leasing As An Option.

Leasing can be a viable alternative for school districts when considering TCO. Once dismissed as impractical because of limited tax advantages, leasing can enable a district to get new computers more frequently and allow for more machines to be acquired at one time (Banks, 1999).

Leasing can also force the issue that a school district will stay current with technology by replacing computers at fixed intervals (every three to five years), and it can ensure that funds are available in future budgets to pay for technology needs.

In terms of deployment, leasing can allow a school district to outfit an entire building with new computers at once, while only paying a portion of the cost annually. A residual benefit of this type of large-scale deployment is that it enables staff members to be trained at once instead of over a multi-year period, which saves money for the district

By leasing, schools don't have to incur the additional expense of disposing of old computers, which can be quite costly. Leasing can also improve the instructional climate of a school, sending a message to staff members that they'll always have access to state-of-the-art equipment.

In the Denver school system, officials first assumed that 10 percent of the district's computers would be retired each year. However, when they calculated the costs associated with leasing computers, they decided that all units would be rotated at the end of a five-year lease (CoSN, 1999).

6. Purchase New Computers "Cloned."

It can take an hour or two to load software onto a single computer and customize it as needed. Multiply this by dozens or hundreds of new computers at a time, and installation can be extremely time-consuming. However, schools can use several techniques to reduce this expense. Using disk-imaging software such as Symantec's Ghost, for example, the hard drive of a single computer can be copied in its entirety to a network or CD-ROM drive and easily installed on other computers in minutes. In addition, several computer manufacturers--such as

Gateway and Dell--offer this service at a minimal cost. You can send them a customized hard drive, and they will install the drive's image on new computers at the factory. When new computers are shipped to your district, they come already loaded with the appropriate software. The cost for this service can range from $35 to $50 per system when purchased, but it can save you the trouble and expense of on-site configuration.

Symantec Corp.
(800) 441-7234
http://www.symantec.com/

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7. Buy The Extended Warranty.

It is highly recommended that school districts purchase extended warranties when buying new computers. This is relatively inexpensive to do at the time of purchase and is well worth the cost. If any component fails during the extended warranty period, the manufacturer takes care of it, usually within 24 hours. To many organizations, this service is the equivalent of having another technician on staff.

The cost of extending the warranty for most computers at the initial time of purchase is about $75 per year. This encompasses service on all system components, including the monitor and keyboard. Recently, several manufacturers have bundled together service contracts for a full three years, including parts and labor. This is a departure from the standard one-year offer of parts and labor, with an additional second and third year of parts only.

Several manufacturers now offer the option of an even longer warranty. For example, Gateway is offering the option of a full five years of service (parts and labor) for an additional $170. Considering the fact that a PC may have thousands of hours of use in five years, the $170 is well worth it. Service calls that are not covered under warranty can run anywhere from $70 to $125 per hour for labor, plus an additional charge for parts. This is a worthwhile investment.

8. Provide Adequate Support.

The importance of providing adequate technical support cannot be overstated. According to a report from the CEO Forum on Education and Technology, "Although technology is being leveraged in the classroom, lack of on-site technical support in schools may discourage teachers from using technology to its fullest potential. Even highly experienced, technology-using teachers can become preoccupied with trouble-shooting hardware and software problems, which siphons time away from students."

Although software has become easier to use recently, installing and maintaining large networked systems actually has become more complex. Schools should have a systematic approach to addressing their tech-support needs. These needs and supporting resources should be evaluated and monitored closely, with room for adjustment as needed. Too often, schools budget for large numbers of additional computers, while neglecting to factor in resources for additional support.

The number of technicians you should have for each computer will vary, depending on the complexity of your network, the level of sophistication among end-users, and the age and reliability of your equipment. In the business environment, a full-time computer support person generally is required for every 50 to 75 computer users. A study by Forrester Research found that in large corporations, there was one support person for every 50 PCs, at a cost of $142 per PC, per year. According to this model, a school district with 1,000 PCs would need a staff of 20 and a budget of $1.4 million for support. Clearly, few districts can afford such a technician-to-computer ratio--but all too often, the other extreme is the norm.

In its TCO comparison between businesses and schools, IDC found that schools have "extremely low" levels of support, usually one person for every 500 computer users, compared to the 1-to-50 ratio it, too, found in the business environment. The state of Maryland, for instance, recently completed a four-year technology plan with a funding projection that assumed there would be one support person for every 500 PCs (CoSN, 1999).

To maintain successful technology programs, schools need to provide adequate and realistic tech-support resources. Well-qualified personnel should be readily available to ensure continuous operation.

9. Establish A Help Desk.

Another way to lower your district's TCO is to implement a help desk. A help desk that logs and tracks all hardware and software problems can lower end-users' frustration by validating their requests for service and giving them a time frame for when the issue will be resolved. It also forces users to report malfunctions in a timely manner, something that every technology coordinator can appreciate.

A help desk can range from simply reporting and tracking problems to providing full-blown assistance to users. The service call data collected will prove to be an invaluable source of information and will allow you to make data-driven decisions for service and support. For example, many requests for assistance might come over time from one particular school or environment, such as an older computer lab. After analyzing the data, you might conclude that it's less expensive to replace the lab altogether, instead of continuing to service it. You might also base staff development decisions on the volume and type of calls coming from a particular school, thus lowering your TCO. Finally, it's prudent to have some baseline data on the number of requests for technical support and turnaround time on these requests when constructing and defending your budget.

Getting started with a help desk is not as intimidating as it sounds. Depending on the size of your district, you can begin with a part-time clerical person who enters service requests into a database. Users can report problems by telephone, eMail, or by completing a web form with the appropriate information. The education field differs from a corporate environment, where users have easy access to a telephone next to their computer. This is where eMail communication can be of value, keeping teachers informed of the status of their service requests so they're not left wondering what is happening.

An important part of developing a help desk is choosing which software to use. There are several help desk packages on the market that are web-based and relatively inexpensive. A technician can service a computer in the field and then close out the call from any browser in the district, automatically sending an eMail message directly to the user that tells her how and when the issue was resolved. WN Help Desk and WN Help Desk Web are server-based help desk packages from Wickett.net that track service call status, user history, and inventory. Rhesolution is another complete help desk product, from Productivity Associates Inc. It's based on the application service provider (ASP) model, meaning the software is hosted on the company's server and you pay an annual subscription fee per user. Both companies offer discounts to schools.

Wickett.net
(916) 988-3268
http://www.wickett.net/

Productivity Associates Inc.
(858) 495-3500
http://www.rhesolution.com/

10. Take Advantage Of Remote Management Tools.

As schools move ahead, they must rethink their support strategies. The prevailing model of one technician servicing a single computer at a time is very expensive--and not very practical. Remote management lets you resolve technical issues over your district's network. Most of us would agree that a successful implementation of networked Windows systems is difficult and expensive to maintain. There is substantial effort involved in configuring Windows-based technology properly, keeping it up to date, and rolling out new software releases and file server service packs. Left uncontrolled, these "hidden" costs can quickly run up your district's TCO (Cini, 2000).

Many older remote management tools have been able to perform a limited number of applications, such as checking a computer's BIOS, hard drive, and other basic information. While most users have software issues that can't be addressed in this manner, a new generation of remote management software is emerging that will address these limitations. Some of the features that are being incorporated into these new tools include the ability to manage the desktop, install software, adjust network settings, and more. Schools that incorporate this approach will lower their TCO substantially by reducing the time technicians spend on-site at the users' computers.

An example of this type of software is Microsoft's Systems Management Server (SMS) suite. Microsoft says its customers can use SMS to roll out new software applications, remotely manage Windows PCs, schedule the execution of maintenance procedures, and maintain automatic inventories of their Windows systems. Once every workstation on the network has the SMS software, or "agent," loaded onto it, you're ready to perform multiple functions.

Microsoft places the software's features into the categories of planning, deployment, and diagnostic tools. Planning tools include hardware and software inventory functions, compliance checking, software metering, and detailed reporting functions. Deployment tools include a host of options for installing software across the network. Software installations and upgrades can be automated or performed manually. For example, you could set up the system to install upgrades to a particular group of computers at a predetermined timeafter hours; users don't have to be logged on at the time. Diagnostic tools include functions such as network tracing, monitoring, remote diagnostics, and critical file server information. In addition, the system can manage a wide area network by controlling bandwidth and bottlenecks.

For Macintosh networks, Thursby Software Systems offers several file-sharing and network utility packages, including DAVE, MacNFS, MacSOHO, and TSStalk. Other remote management products include Novell's ManageWise, AimIT from Computer Associates, and WinINSTALL 2000 from Veritas Software.

Remote management software can lower your district's TCO substantially by automating many functions that a technician otherwise might deal with. In the next few years, this will be a large growth area for software. Gartner Group's Dataquest unit projects roughly 20 percent annual growth in the worldwide market for network management software through 2004 (Udell, 2000).

Thursby Software Systems
(817) 478-5070
http://www.thursby.com/

Novell Inc.
(888) 321-4272
http://www.novell.com/

Computer Associates
(800) 225-5224
http://www.ca.com/

Veritas Software
(800) 327-2232
http://www.veritas.com/

11. Consider outsourcing functions as necessary.

Often, teachers are asked to maintain computer systems in the interest of saving money. However, this model might be more expensive than it seems. Consider the following example: A teacher employed by a school district makes $45,000 a year and works 185 days. The hourly rate for that person is about $40. Many system integrators can supply network technicians to schools for about the same hourly rate through a long-term arrangement. The difference is that the network technician is able to resolve technical issues in less time because of his or her training and the resources available.

Teachers are rarely asked to repair any other type of instructional equipment in schools, and computers should not be an exception. Good, tech-savvy teachers are hard to find, and their time would be better spent empowering students and colleagues to work productively and independently with technology. This, in itself, will reduce a school district's TCO.

Another place to explore outsourcing is the hosting of school district applications. ASPs can reduce a smaller district's TCO by freeing its technical staff from updating software and maintaining expensive servers. Through the ASP model, the provider hosts and runs the application from its own servers, and students and staff can access the software using a simple web browser. According to a March 2000 survey by International Data Corp., worldwide spending on ASP solutions will grow from $300 million in 1999 to nearly $8 billion by 2004.

For more information on ASPs, refer to following web sites:

SchoolTone Alliance
http://www.schooltone.com/

ASP Street.com
http://www.aspstreet.com/

Application Rental Guide
http://www.findapps.com/

12. Invest In Professional Development.

Finally, one of the most important things you can do to lower your TCO is to implement a well-designed staff development program. When staff members are properly trained, they will make good use of the technology available to them, and your investment in equipment will pay off. Adequate training should be provided to all members of the district, including teachers, administrators, clerical staff, and instructional assistants. Moreover, teachers need to have not only clear instructions for using technology, but also a clear purpose. Many school districts make the mistake of training their staff only on the mechanics of software use, neglecting its connection to the curriculum. Technology must be embedded into the curriculum to be integrated effectively.

To reduce your TCO, you must have the ability to continually assess how technology is being delivered and supported within your district. It's also important to have the flexibility to adjust to changes in trends, technology, personnel issues, and more. By considering all the obvious and hidden costs of technology, your potential for success will be greatly improved. Applying the principles of TCO will help you make the most of your investment in technology.

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